4-WIRE TRANSMISSION ONLY (4WTO) CHANNEL UNIT, 628200, AND 4-WIRE TRANSMISSION ONLY FOR USE WITH EXTERNAL SF SIGNALING (4WTO/SF) CHANNEL UNIT, 628205

GENERAL DESCRIPTION

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1. GENERAL

1.01 This Section provides a general description of the ITT D448 4-wire transmission only (4WTO) channel unit, 628200, and 4-wire transmission only for use with external SF signaling (4WTO/SF) channel unit, 628205 (Fig. 1), to the functional block diagram level.

1.02 This Section has been reissued to include information on the handling of CMOS-equipped units and to correct Fig. 2.

1.03 The 4WTO unit provides a voice frequency (VF) interface between the central office (C.O.) equipment and the D448 multiplex terminal common equipment. In the transmit direction, the 4WTO unit converts VF information into pulse code modulation (PCM) for application to the common equipment. In the receive direction, the 4WTO unit decodes received PCM into VF information. During system outages, the 4WTO unit provides various disconnect/make-busy routines for the trunk. The 4WTO unit provides a 600-ohm, 4-wire message circuit.

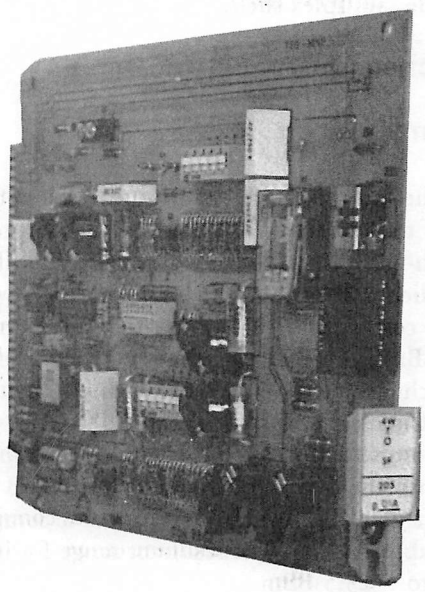

Fig. 1—4WTO/SF Channel Unit, 628205

1.04 The 4WTO/SF unit is identical to the 4WTO unit with additional circuitry added for external SF signaling.

2. DESCRIPTION

2.01 Each unit mounts in the D448 multiplex shelf (channel unit mounting section) in connectors J1A through J24A (for Digroup A) or connectors J1B through J24B (for Digroup B). Installation procedures for the unit are provided in Section ITTR-18-441.

2.02 Each unit is available in Group -0 only.

2.03 Each unit consists of an epoxy-glass printed circuit board (PCB) and associated circuit components. The lower front edge of the PCB is fitted with a handle to facilitate insertion and removal of the unit from the shelf. An identification strip on the handle face indicates the unit mnemonic (4WTO or 4WTO/SF), last three digits of the model number, last three digits of the part number, and issue letter. The part number and issue letter are also located on the component side of the PCB.

2.04 The BSY switch (S4), on the 4WTO/SF unit only, and the splitting card jack (J1) are located on the front edge of the PCB.

2.05 Printed circuit wiring is etched on both sides of the PCB. The units inputs and outputs are terminated in gold-plated contacts on the rear edge of the PCB. These contacts mate with a 60-pin contact edge connector on the rear of the multiplex shelf.

3. FUNCTIONAL OPERATION (FIG. 2)

TRANSMIT VF CIRCUIT

3.01 The incoming VF is transformer-coupled, via part of the transmit (TX) level DIP switch, to the low-pass/high-pass filter where it is amplified and filtered. The gain applied to the input signal can be varied over a 31-dB range to compensate for VF input levels from +9.0 to −22.0 dBm (in 1-dB steps) by the selection of TX level DIP switch options [+1], [+2], [+4], [+8], and [+16]. The resulting signal is passed to the TX office wiring loss (OWL) compensation circuit. The TX prescription OWL options provide 0 to 1.5 dB of gain in 0.1-dB steps. The resulting signal is applied to the encoder to compensate for wiring/cabling losses. The resultant range for input levels is +9.0 to −23.5 dBm.

3.02 The encoder converts the VF signal information to an 8-bit PCM word. When the TX AND gate is activated by the transmit logic unit (TLU) on the TCS4-X and TCS6-X leads, the 8-bit word is applied to the TLU via the TCD bus. The data is clocked out of the unit under control of the 1.536-MHz clock from the TLU.

RECEIVE VF CIRCUIT

3.03 An 8-bit PCM word from the receive logic unit (RLU) is applied to the decoder on the RCD bus. The decoder will only accept the data when the receive (RX) AND gate is activated by the RLU on the RCS4-X and RCS6-X leads. The decoder converts the PCM word into VF signal information.

3.04 The VF signal is applied to the low-pass filter and passed through to the RX OWL compensation circuit. The RX prescription OWL options provide 0 to 1.5 dB of gain in 0.1-dB steps to the signal out of the low-pass filter to compensate for office wiring/cabling losses. The output of this circuit is further amplified. This amplification can be varied over a 31-dB range (in 1-dB increments) by the selection of RX VF level DIP switch options [−1], [−2], [−4], [−8], and [−16]. This provides output levels of +10.5 to −22.0 dBm in 0.1-dB increments with both the OWL and VF level options. The amplified VF is transformer-coupled to the C.O. equipment.

CARRIER GROUP ALARM

3.05 On the 4WTO unit during a system outage, the OS lead is grounded after a delay. On the 4WTO/SF unit during a system outage, two carrier group alarm (CGA) signals (CGA immediate ground and CGA delay) and two CGA option screws ([K] and [EG]) control the CGA functions of the unit. When a CGA occurs, the CGA lead provides an immediate ground to the unit, and the CGA DELAY lead provides a delayed ground to the unit. Both grounds remain until the CGA condition is cleared. Strapping options on the backplane of the multiplex shelf control when the CGA immediate ground occurs after an alarm signal is received.

3.06 On the 4WTO/SF unit when neither CGA option is selected, the CGA immediate ground breaks the E to EB loop by energizing relay K1. Also, regardless of the options selected, the OS lead is grounded when the CGA delayed ground is received by the unit.

3.07 When option screw [K] is selected, the relay is energized and a ground is placed on the E lead.

3.08 When option screw [EG] is selected, the relay is energized by the CGA delayed ground which causes a ground to be placed on the E lead after a delay.

BUSY MODE

3.09 On the 4WTO/SF unit when the BSY switch is placed in the BSY position and option strap [BN] is installed, the E to EB loop is opened and a ground is placed on the E lead.

4. OPTIONS

4.01 The 4WTO unit is equipped with DIP switch options. The 4WTO/SF unit is equipped with DIP switch options, screw-down options, and strapping options for selecting circuit options. Refer to Section ITTR-18-441 for detailed information on option selection.

4.02 The multiplex shelf provides options on the backplane which control the CGA timing of the terminal. Refer to Section ITTR-18-405 (for shelves mounted in 23-inch bays) or ITTR-18-406 (for shelves mounted in 19-inch bays) for option selection information on these options.

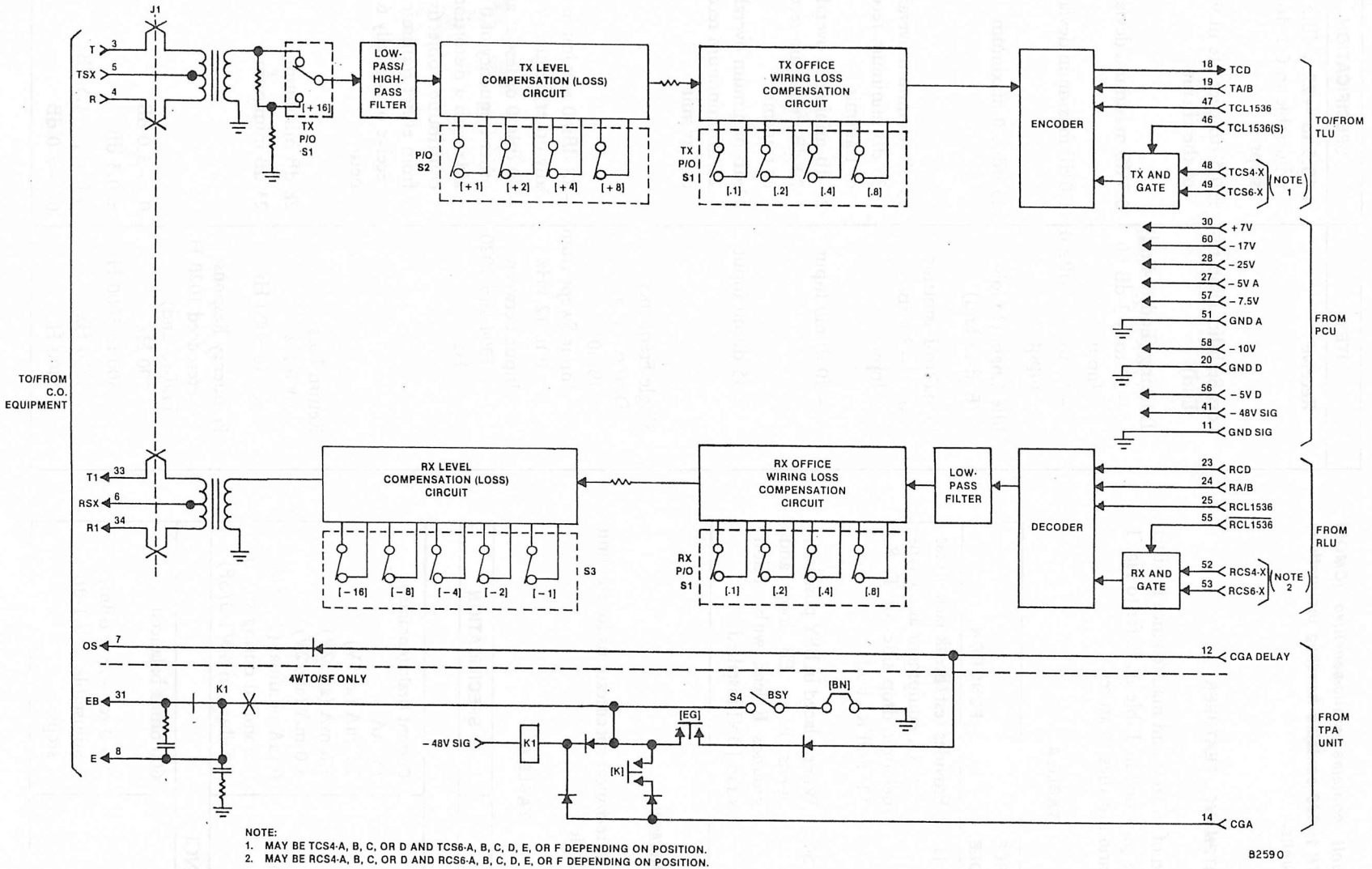

Fig. 2—4WTO Channel Unit, 628200, and 4WTO/SF Channel Unit, 628205, Functional Block Diagram

5. RESTRICTIONS

WARNING: This unit contains static-sensitive (CMOS) devices. Section ITTR-18-599 contains handling instructions for CMOS-equipped units.

6. TEST AND MAINTENANCE FEATURES

6.01 A description of the test and maintenance features of the unit is provided in Table A. Refer to Fig. 1 for the physical location of these features.

TABLE A

FEATURE	REF. DES.	FUNCTION
Splitting Card Jack	J1	Provides test/break jack access to C.O. equipment and channel unit drop sides of T, R, T1, and R1 leads.
BSY Switch (4WTO/SF Only)	S4	When placed in BSY position, opens E to EB loop and grounds E lead with option strap [BN] installed.

7. TECHNICAL SUMMARY

7.01 A summary of technical specifications for the unit is given in Table B.

TABLE B

ITEM	SPECIFICATION
DC POWER	
Voltage	**Current Drain (nominal)**
−5V	15 mA
−10V	2.0 mA (at 5V)
+7V	5.0 mA (at 12V)
−17V	5.0 mA (at 12V)
−48V Signaling Battery	0 mA nominal (7.0 mA nominal during system failure on 4WTO/SF)
VF PERFORMANCE	
Impedance	600 ohms balanced
Levels	
Transmit	+9.0 to −23.5 dBm, adjustable in 0.1-dB steps
Receive	+10.5 to −22.0 dBm, adjustable in 0.1-dB steps
Loss Stability (End-to-End)	±0.5 dB over life in 95% of the circuits
Tracking (End-to-End)	
−37 to +3 dBm0 Input	0.5 dB maximum deviation
−50 to −37 dBm0 Input	1.0 dB maximum deviation
Idle Channel Noise (End-to-End)	23 dBrnc0 maximum
Signal-to-Distortion	
0 to −30 dBm0 Input	33 dB minimum overall; 35 dB minimum receive or transmit
−40 dBm0 Input	27 dB minimum overall; 29 dB minimum receive or transmit
−45 dBm0 Input	22 dB minimum overall; 25 dB minimum receive or transmit
Single Frequency Distortion (at 0 dBm0)	
Input Swept from 0 to 12 kHz	−28 dBm0 maximum at any other frequency
Input between 1004 and 1020 Hz	−40 dBm0 or less at any other frequency of 0 to 4 kHz with a distortion contribution objective from either transmit or receive of typically 6 dB better
Return Loss	
1000 Hz	28 dB minimum
300 to 3000 Hz	23 dB minimum
Frequency Response (Referenced 1020 Hz End-to-End)	
200 Hz	0, −3.0 dB
300 to 3000 Hz	±0.3 dB
3200 Hz	+0.15, −1.5 dB
3400 Hz	0, −3.0 dB

TABLE B (CONT)

ITEM	SPECIFICATION
Longitudinal Balance (AT&T or IEEE Method)	
At each port with simplex lead open	
200 Hz	86 dB minimum
1000 Hz	80 dB minimum
3000 Hz	78 dB minimum
With 300 ohms between simplex lead and ground	
200 Hz	66 dB minimum
1000 Hz	60 dB minimum
3000 Hz	58 dB minimum
SIMPLEX OPERATION (AT EACH VF PORT)	
Simplex Lead Current (Sum of Tip and Ring Current)	60 mA maximum
Current Unbalance (Difference Between Tip and Ring Current)	1.5 mA maximum
OPERATING ENVIRONMENT	
Temperature	0 to +55°C
Humidity	To 95% at 40°C (no condensation)
Altitude	To 14,000 ft (4,300 m)
DIMENSIONS	
Width	0.8 in. (1.9 cm)
Height	5.9 in. (15.0 cm)
Depth	9.7 in. (24.6 cm)
WEIGHT	
4WTO	0.8 lb (0.4 kg)
4WTO/SF	0.9 lb (0.4 kg)

8. REPLACEABLE PARTS

8.01 These units have no field-replaceable parts.

9. REFERENCES

9.01 The engineering drawings noted in Table C were used in the preparation of this Section.

TABLE C

TYPE	DRAWING NO.
Assembly	628200-000
Schematic	628200-002
Assembly	628205-000
Schematic	628205-002

9.02 Related information on the units may be found in the ITTR Sections referenced in Table D.

TABLE D

TITLE	SECTION NO.
Connectorized Multiplex Shelf (MS/WC7, MS/WC5, MS/C7 and MS/C6), 628001, 628005, 628011 and 628015 (For 23-Inch Bays) — Option Selection, Installation and Pretest	ITTR-18-405
Connectorized Multiplex Shelf (MS19/WC7, MS19/WC5, MS19/C7 and MS19/C6), 628003, 628008, 628013 and 628018 (For 19-Inch Bays) — Option Selection, Installation and Pretest	ITTR-18-406
Special Service Channel Units — Option Selection and Installation	ITTR-18-441